Maintaining
Mission-Critical Operations
and Ensuring Connectivity
During a Disaster

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This Session Will Provide...

❖ Best-practices on how to configure a truly redundant network for disaster recovery and continuity of operations

❖ Insight on the optimal technology mix for effective disaster recovery

❖ Increased understanding of the importance of path diversity and redundancy

❖ Exposure to case studies demonstrating the business impact of configuring a network that is not truly redundant or path diverse

Show you how to eliminate your network's weakest link

Show of Hands:

❖ If you experienced network interruption due to

- – Event that happened near your office (accident, fire, construction, etc.)

- – Failure of the local central office (flooding, power or network outage)

- – Network Carrier experienced a widespread outage

❖ If the outage had an impact on worker productivity or it impacted the safety of the community (issues with 9-1-1 or emergency communications)

Reasons for Network Outages

FLOODS

HURRICANES
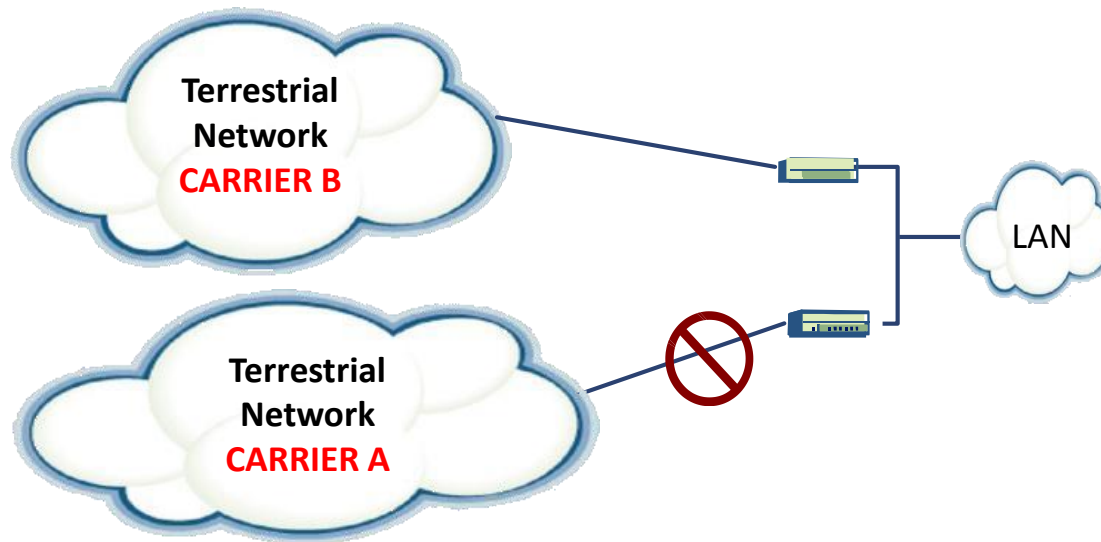
SABOTAGE

EARTHQUAKES

STORM DAMAGE

FIRES

NETWORK POWER FAILURE

TORNADOES

Traditional View of Diversity

- Deploy 2nd terrestrial line, or even Cellular network

- Policy Based Routing (PBR) provides automatic failover

Continuity of Operations (COOP) Requirements

❖ Maintain connectivity in the event that the primary network fails

❖ Ensure an alternate path is available to support your Voice / Video / Data communications

❖ Prioritize the critical network traffic if you are operating at less than 100% bandwidth

❖ Minimize down time and maximize employee productivity

"the weakest link in a landline communication network is the local access facility that connects an enterprise site to a point-of-presence (PoP) at the central office of the common carrier.

"a redundancy plan utilizing different landline carriers does not, by default, provide an enterprise with true backup capability"

Jay Pultz, Gartner Group
Networking Vice President and Research Director

Basic Physical Path Diversity

Satellite Network

LAN

Terrestrial Network
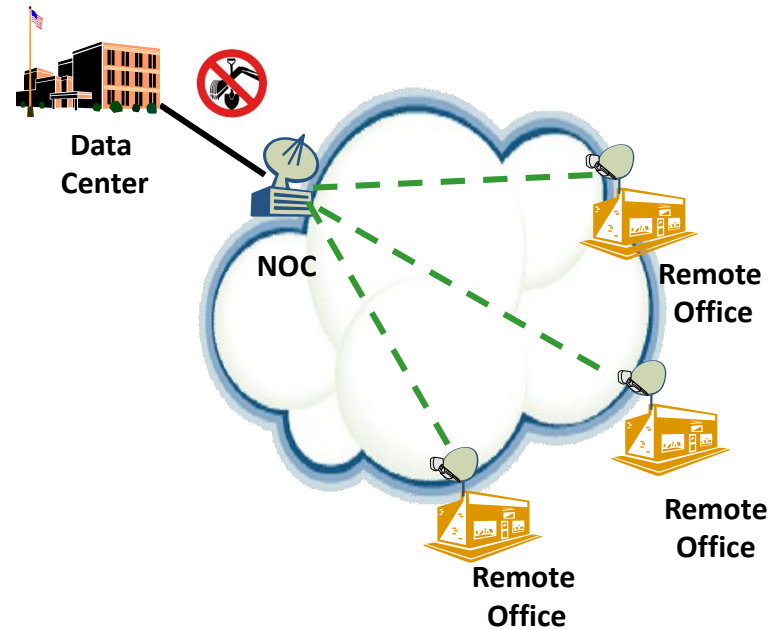
True Path Diversity
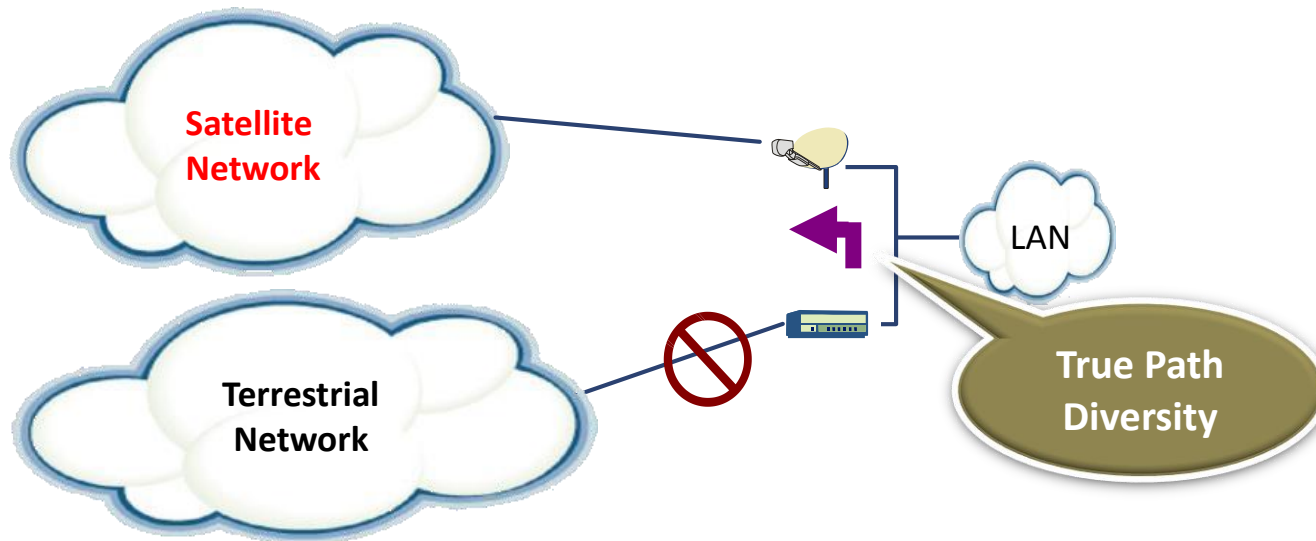
- Bypass the terrestrial network in the event of service disruption

- Policy Based Routing (PBR) provides automatic failover

Optimal Satellite Back-up Model

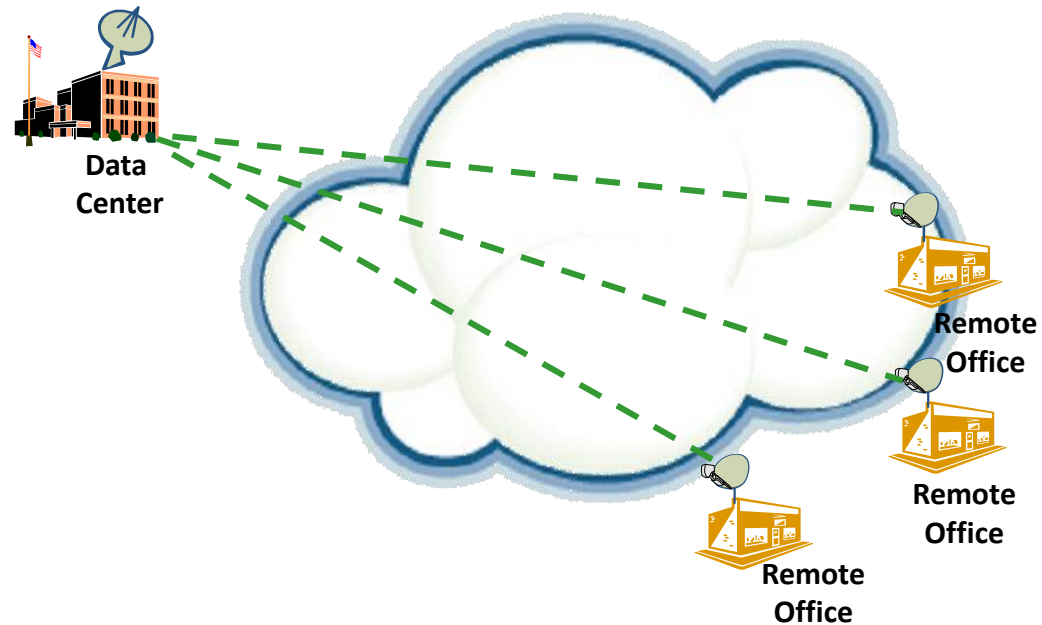**Terrestrial Backhaul can be the weak link**

Traditional Ku-band Satellite

Point-to-point ka-band Satellite

Terrestrial Backhaul Is bypassed

Data Center

NOC

Remote Office

Remote Office

Remote Office

Data Center

Remote Office

Remote Office

Remote Office

- Star connectivity only
- Double hop between locations
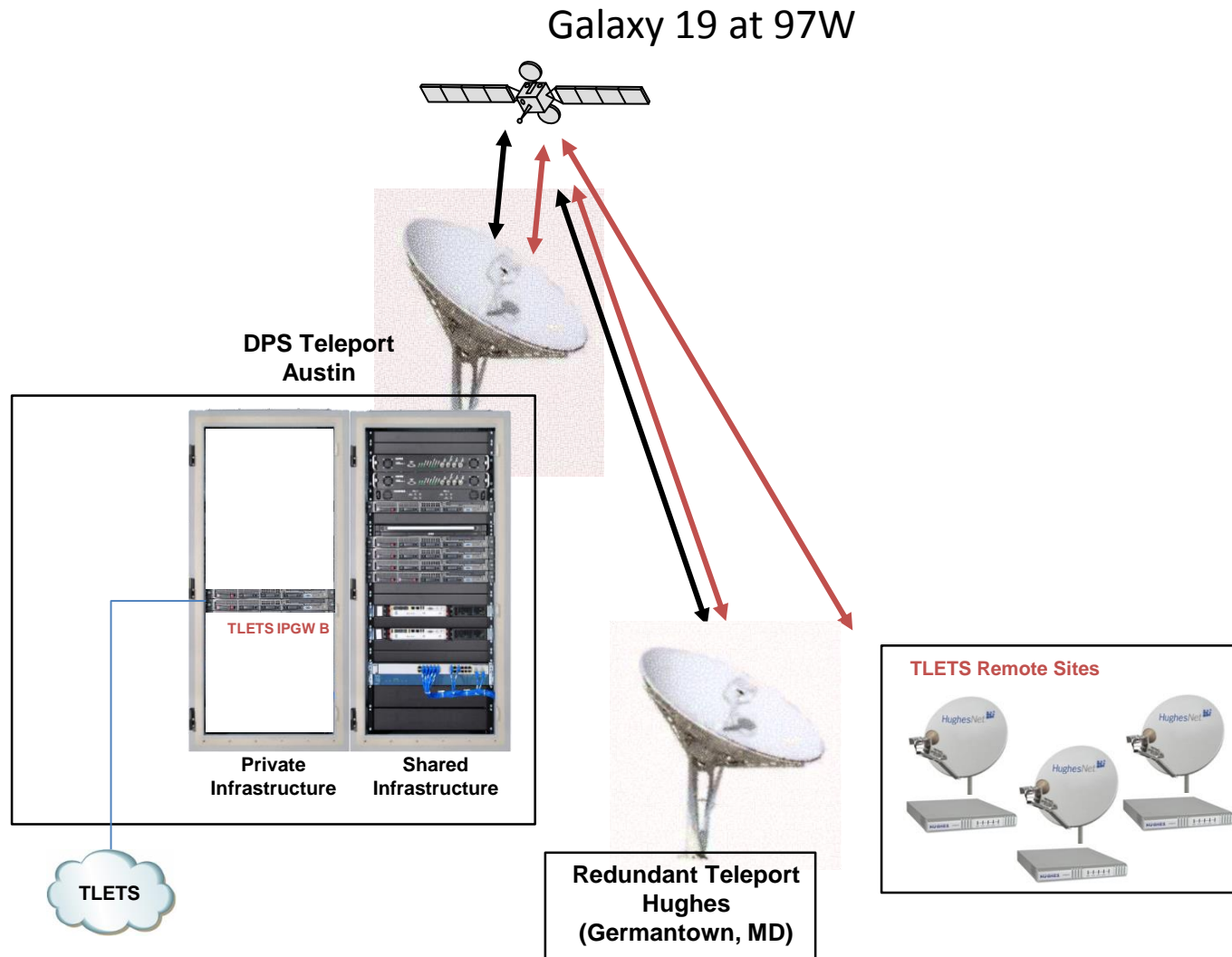
- Reliant on backhaul between Data Center and NOC

- Full-mesh or star connectivity
- Single hop connection between Data Center and Remote Offices

- **Is not reliant on the terrestrial connection**

How COOP Works

Hughes Proprietary
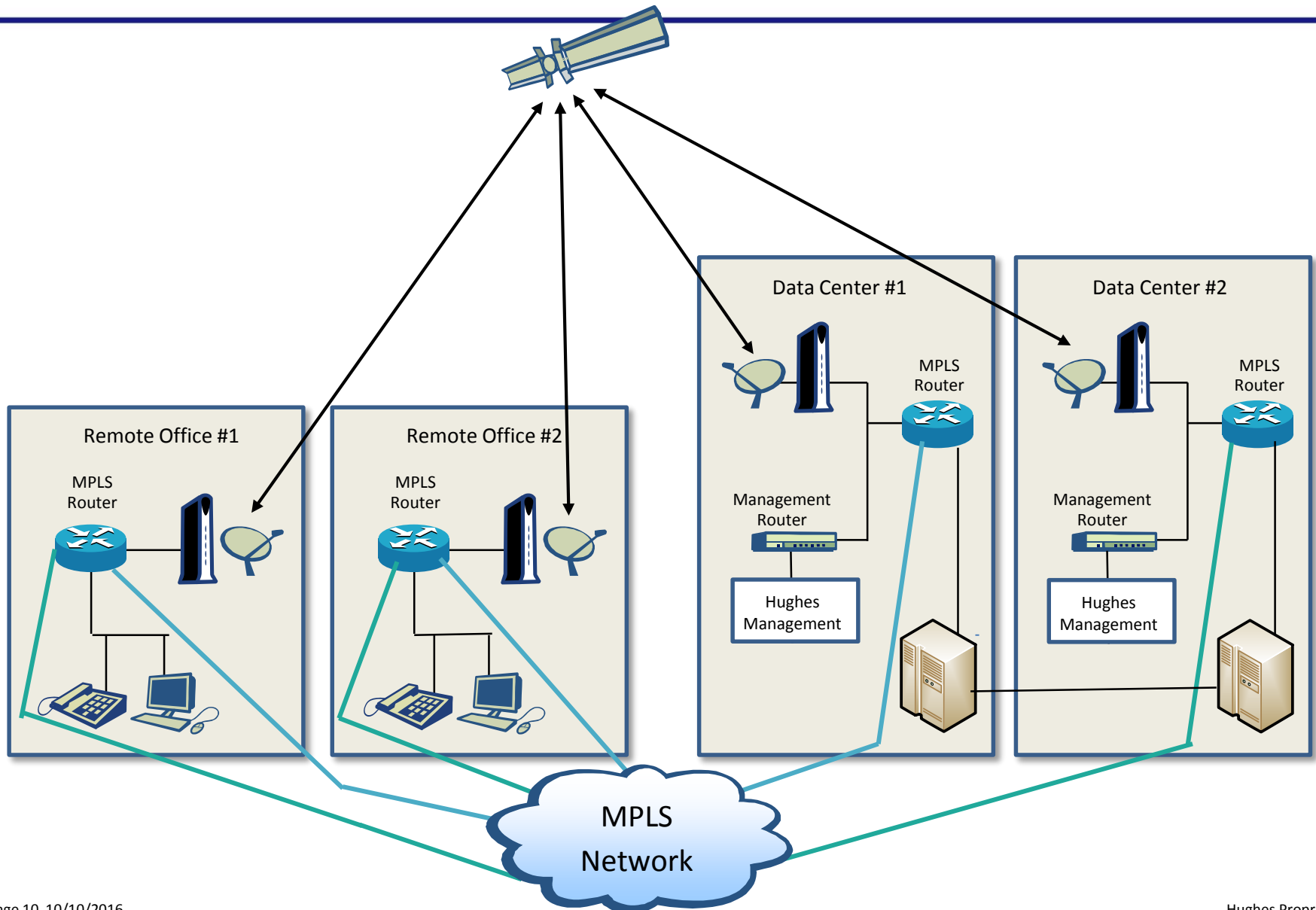
USE CASES
&
APPLICATIONS

Texas Department of Public Safety
(860 TLETS Remote Sites)

Galaxy 19 at 97W

DPS Teleport Austin

TLETS IPGW B

Private Infrastructure

Shared Infrastructure

TLETS

Redundant Teleport Hughes (Germantown, MD)
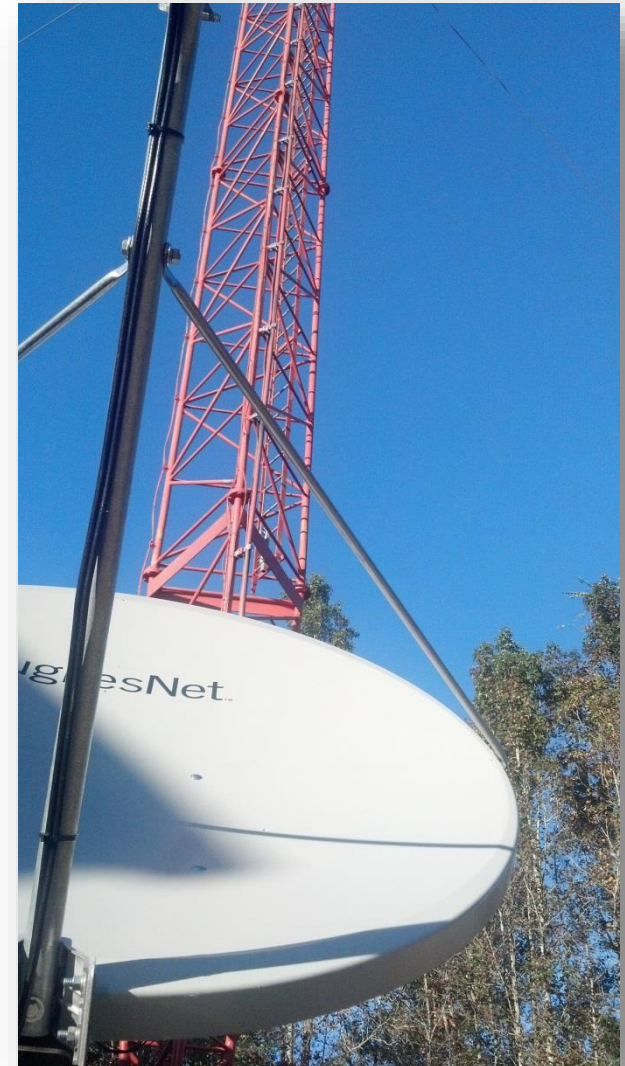
TLETS Remote Sites

"We understand that network challenges occur and also that there isn't a particular method that is THE single solution."

"As a result we're setting up a diverse satellite network to provide additional redundancy to ATCOG's regional 9-1-1 system for the safety of our citizens."

"A network solution using site to site satellite communications complements our primary network and provides an alternate communication path should issues arise."
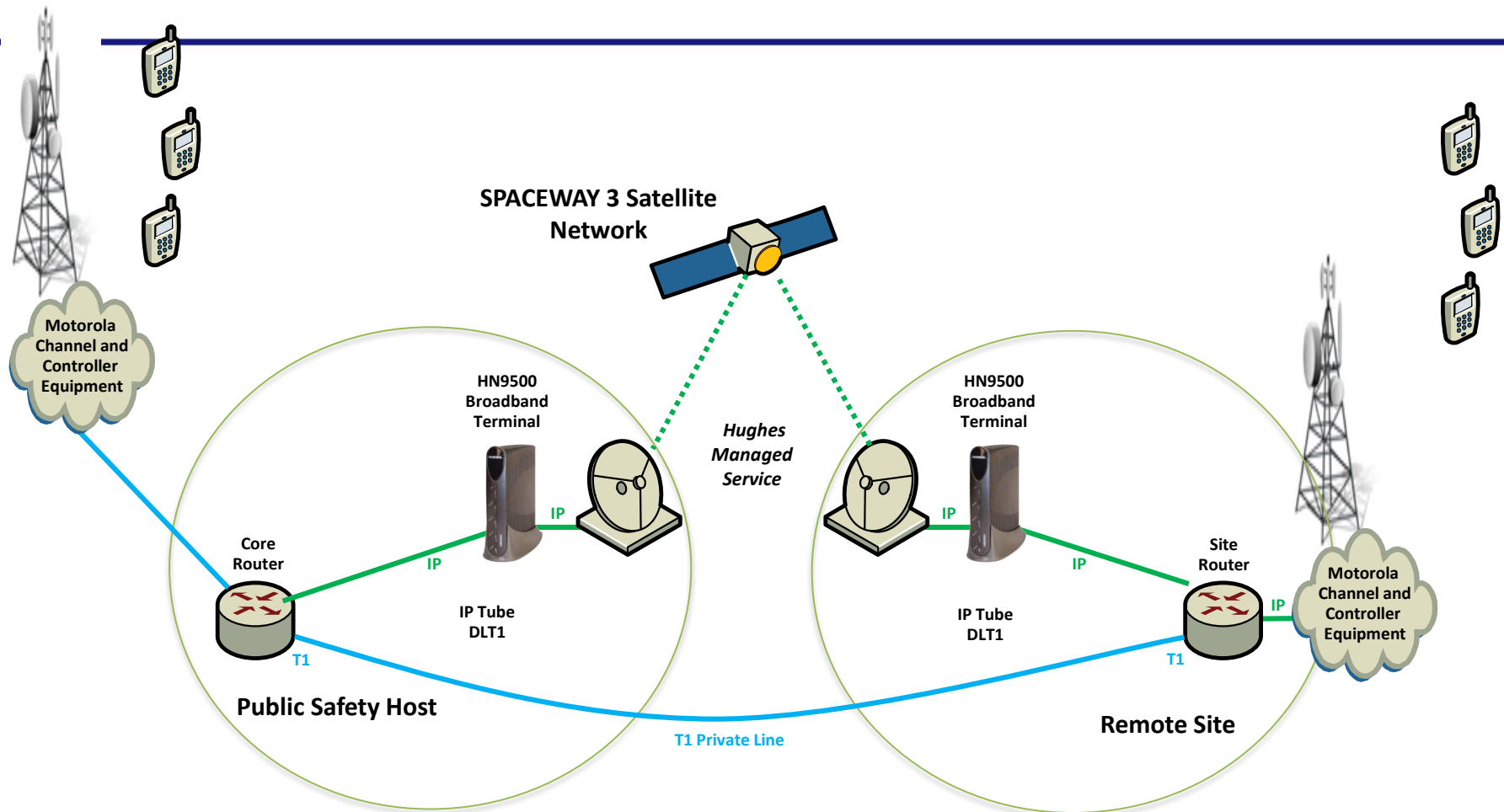
Mary Beth Rudel, Ark-Tex Council of Governments
Public Safety Manager

Land Mobile Radio Backup

Solution for LMR Backhaul

SPACEWAY 3 Satellite Network

Hughes Managed Service

Motorola Channel and Controller Equipment

HN9500 Broadband Terminal

Core Router

IP

IP

IP Tube DLT1

T1

Public Safety Host

HN9500 Broadband Terminal

IP

Site Router

IP

IP Tube DLT1

T1

Remote Site

Motorola Channel and Controller Equipment

T1 Private Line

Redundant signal transport for LMR network

- ❖ Primary T1 backhaul provides normal operation from LMR transmitting Tower
- ❖ If Primary T1 backhaul link fails, satellite serves as backup
- ❖ Routes traffic directly to the Public Safety Host

Network Interoperability

❖ Facilitates communications among crisis management leaders

❖ Enabled by satellite technologies that:

– **Complement** current Government terrestrial networks

– **Replace** terrestrial networks (when compromised by an extraordinary event)

– Activate previously established and/or ad-hoc user groups, for example:

White House	⟺	State Governors
State governors	⟺	National Guard
1st responders	⟺	State emergency agencies
FEMA/DHS	⟺	State emergency agencies
CDC	⟺	State health agencies
DOJ	⟺	S&L law enforcement
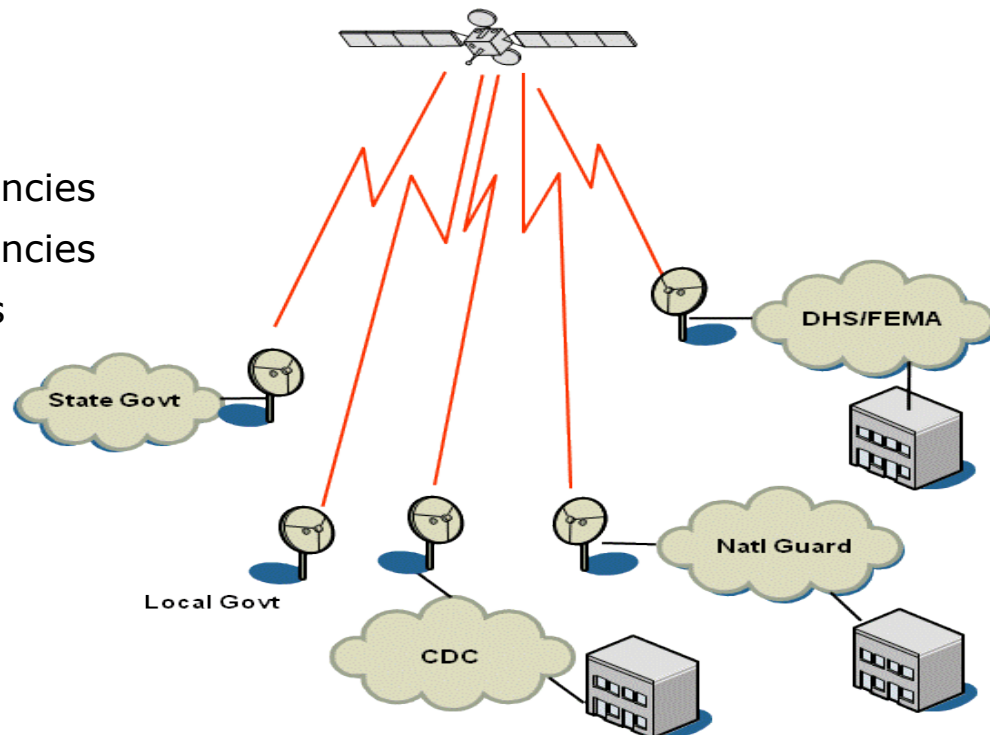
Telehealth

❖ Challenges
  – Terrestrial Broadband is not everywhere
  – Unable to get high-speed connectivity
  – Needed to transmit electronic medical data
  – Need to conduct on-line video consultations

❖ Establish a satellite telehealth solution to provide
  – Videoconferencing
  – Transfer of Electronic health records
 – Viewing of digital images
  – Prescription dispensing

Emergency Communications

Communications Industry Impact from Sandy

❖ Terrestrial networks were knocked out by flooding and lack of fuel

– Base stations

– Towers and backhaul

– Major NY Switching centers

❖ Wireless Networks were severely impacted - reliance on terrestrial infrastructure for backhaul

❖ Satellite networks

– Customers still needed power

– Withstood the disaster quite well

– Limited or no disruptions to services

– Antennas can generally withstand up to 150mph winds
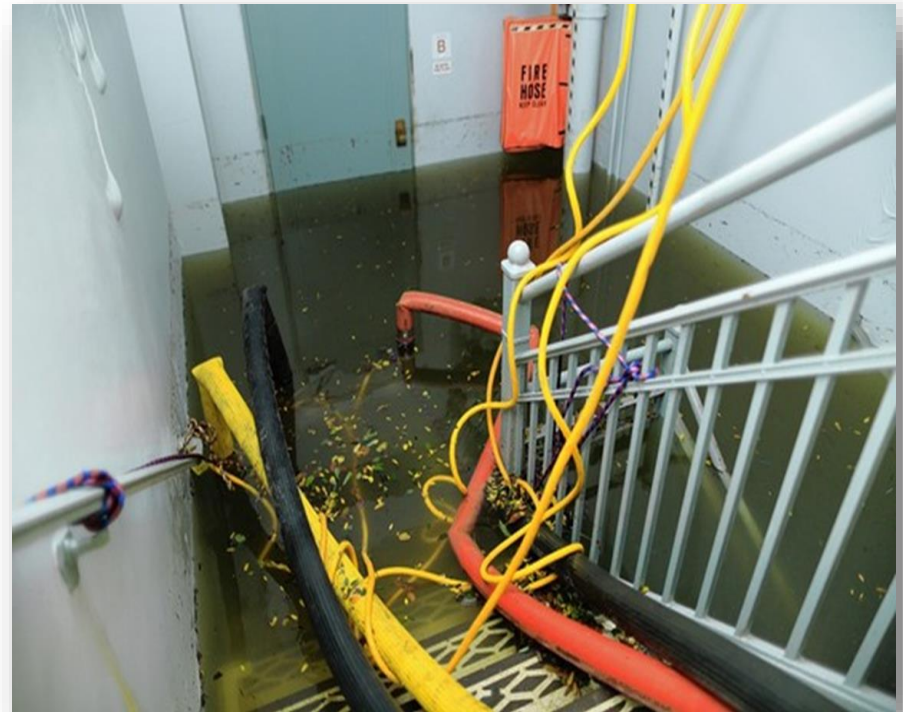
FEMA (20 DRCs in NY/NJ)

❖ Expectations

– Anticipated October 29, 2012 Landfall of Superstorm Sandy

– Expectation that Wireline/Wireless Communications would be devastated

❖ Concern

❖ Response and recovery efforts for Superstorm Sandy would require Communications Networks for a greater amount of FEMA Disaster Recovery Centers

Courtesy of FEMA/Desiree Matel-Anderson

❖ Hughes Solution

– Full turnkey solution (store, install, deploy, and de-install VSAT equipment VSAT equipment)

– 48 hour emergency deployment of VSAT / Wi-Fi / 8 Voice lines

– Unlimited Internet and Voice usage

– 20 DRCs were enabled with Hughes Spaceway 3 and Echostar XVII (also Hughes Ka Satellite)

Habitat for Humanity

- ❖ Impacts of Superstorm Sandy
  - – Over 110 homes damaged in Breezy point, NY
  - – Flooding and power outages knocked out communications
  - – Wire line network base stations, towers, and switching centers were ineffective

- ❖ Habitat Command Center
  - – Expedited the rebuilding effort by connecting response teams and leadership
  - – No Wire line communications were available

- ❖ Satellite Communications were established
  - – Hughes is a member of Global VSAT forum and Disaster Preparedness Registry
  - – Hughes responded to the need and installed VSAT connection partnering with Cisco
  - – Joint solution to provide voice and data services for Habitat
  - – Delivered speeds up to 10 Mbps downlink

Sandy User Impact

❖ **Impact to Business and Government**

   – Offices with power were unable to communicate due to terrestrial and wireless network outages

      ❖ Coordination with out of state resources was complicated by regional wireless network outages

   – No power > No gas pumps > No fuel for response vehicles

      ❖ Hughes provided critical info to responders in impact area showing which businesses were fully connected to our network – meaning had POS connectivity (must have power too)

      ❖ Responders were then able to coordinate where to get gas, food, lodging, meds, etc. eliminating the guesswork - time wasted driving and looking for open businesses

   – Contingent network plans were mostly not in place for automatic failover resulting in:

      ❖ Days of network downtime

      ❖ Lost employee productivity

      ❖ Inability to serve the public

❖ **"Reaction Mode" was in effect. "Response Mode" was delayed.**

   – Difficult to obtain service once impacts were felt

   – Vendors' inability to quickly deliver alternate service

   – Private networks down, Business Applications unusable

   – Outage time = Days and Weeks

Sandy Lessons Learned

❖ Regardless of impact, government's mission to serve its citizens must continue

❖ Preparation - be ready for anything with Business/Government Continuity of Operations as the objective!

  – Business as usual operations

  – Minimize outage time to ZERO

Sandy Lessons Learned

Establish a Plan B or COOP in advance to secure People, Power and Telecommunications resources

❖ People

- Design a plan that keeps people safe

- Prepare a list of all key provider contacts on paper and easily accessible

- Move a portion of your support staff to an office/location away from the impact area

- In the impact area, book hotel rooms near your local facility, so staff can walk to work if roads are closed and public transit is not operating

❖ Power

- Install solar and battery system or a propane-powered or diesel generator that can run for several weeks if necessary

- Replace the UPS units for desktops every two years and for servers every three to five years

Sandy Lessons Learned

❖ Communications

– Maintain multiple Internet and enterprise connections

– Maintain several analog phone lines and phones that do not require power to function.

– Back up your data and store copies off-site.

  ❖ Store tape backups in a protected, remote location.

  ❖ Better yet, co-locate as well. Test your backups regularly.

– Maintain off-site, disaster-proof data centers.

– Keep your Web servers in diverse locations to ensure your agency's connection to the public remains uninterrupted.

– Consider a business continuity plan to implement Auto Failover from your terrestrial network, aka, Communications Path Diversity

  ❖ Have contracts in place for alternate services to achieve COOP

  ❖ Pre-test specific Business Applications

– Ensure alternate service provider has access/egress authorization to affected disaster area

WHAT IS YOUR WEAKEST LINK?

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DIR Contracts

DIR-TEX-AN-NG-CTSA-002   (Fixed Satellite Service and SOHO)
DIR-TSO-2673   (Digital Media and Learning Management)
DIR-TSA-3364   (Digital Media, Learning Management, and Wi-Fi)